Interlayer Properties Reference Guide

Shear modulus, physical properties, and EN 16613 design values for common laminated glass interlayer materials

Materials covered	7 interlayer grades
Standard conditions	11 EN 16613:2019 loading scenarios
Data source	DMTA characterisation + time-temperature superposition
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1. Material Properties Summary

Physical and mechanical properties for all interlayer materials in the database. Values are representative and sourced from manufacturer datasheets and laboratory characterisation.

Material	Density (kg/m3)	Poisson Ratio	Tensile (MPa)	Elong. (%)	Adhesion	Temps Avail.
Ionomer	950	0.4783	34.5	400	High	12 (-20 to 80°C)
Ionomer Xtra	950	0.4783	34.5	400	High	12 (-20 to 80°C)
PVB Clear	1070	0.4750	25.0	266	Medium	12 (-20 to 80°C)
PVB Extra Stiff	1080	0.4750	33.0	196	High	12 (-20 to 80°C)
PVB Extra Stiff PRO	1080	0.4750	34.0	200	High	9 (10 to 70°C)
PVB Extra Stiff S	1080	0.4750	33.0	196	High	9 (10 to 60°C)
Sound Control Monolayer	1070	0.4783	22.0	250	High	12 (-20 to 80°C)

Tensile strength measured per ISO 527-3 (PVB, EVA, Sound Control) or ASTM D638 (Ionomer).

2. Shear Modulus at EN 16613 Standard Conditions

Effective shear modulus G(t, T) in MPa for each material at the 11 standard loading conditions defined in EN 16613:2019 Table 4. Values are obtained by evaluating the relaxation master curve at the specified duration and temperature via log-log interpolation. Where the exact temperature is not in the dataset, Williams-Landel-Ferry (WLF) time-temperature superposition is applied.

Condition	t	T (°C)	Ionomer	Ionomer Xtra	PVB Clear	PVB Extra Stiff	PVB ES PRO	PVB ES S	Sound Ctrl
1 - Wind gust	3 s	35	102.000	70.353	0.508	5.763	24.238	8.300	0.372
2 - Wind gust (cold)	3 s	-20	290.000	243.193	230.508	440.678	420.000	576.000	175.884
3 - Wind storm	10 min	35	47.700	22.019	0.322	0.780	0.880	0.570	0.176
4 - Wind storm cold	10 min	-20	284.000	226.619	122.034	267.797	420.000	576.000	57.500
5 - Balustrade	30 s	30	119.000	84.559	0.508	9.831	25.000	11.000	0.338
7 - Maintenance	30 min	40	11.400	7.002	0.197	0.610	0.600	0.400	0.088
8 - Snow (3 w)	3 w	0	222.000	75.089	1.356	4.407	278.269	552.149	0.406
9 - Snow (5 d)	5 d	20	130.000	29.528	0.319	1.051	2.200	1.400	0.108
10 - Climatic 6h	6 h	40	5.760	2.642	0.092	0.475	0.470	0.370	0.029
11 - Climatic 12h	12 h	60	1.350	0.612	0.061	0.163	0.180	0.240	0.037
12 - Permanent	50 yr	60	0.740	0.091	0.061	0.163	0.180	0.240	0.037

All values in MPa. t = load duration, T = reference temperature per EN 16613:2019. Condition 6 (soft body impact) not included as it requires dynamic analysis.

3. EN 16613:2019 Loading Conditions

The 11 standard loading conditions from EN 16613:2019 Table 4 used in the shear modulus lookup above. Each defines a design scenario with a specific load duration and reference temperature.

#	Condition	Duration	Temperature	Category
1	Wind gust	3 s	35°C	Wind
2	Wind gust (cold)	3 s	-20°C	Wind
3	Wind storm	10 min	35°C	Wind
4	Wind storm cold	10 min	-20°C	Wind
5	Balustrade	30 s	30°C	Balustrade
7	Maintenance	30 min	40°C	Imposed
8	Snow (3 w)	3 w	0°C	Snow
9	Snow (5 d)	5 d	20°C	Snow
10	Climatic 6h	6 h	40°C	Climatic
11	Climatic 12h	12 h	60°C	Climatic
12	Permanent	50 yr	60°C	Permanent

4. Notes and Disclaimers

Data source: Relaxation master curves are derived from Dynamic Mechanical Thermal Analysis (DMTA) with time-temperature superposition (TTS). WLF shift factors use default constants C1 = 17.44, C2 = 51.6°C unless material-specific values are available.

Temperature interpolation: Where the exact EN 16613 reference temperature is not directly available in the characterisation dataset, the relaxation curve is shifted using the Williams-Landel-Ferry (WLF) equation from the nearest available reference temperature.

Intended use: This reference guide is provided for preliminary design and material comparison purposes. Values should be verified against manufacturer datasheets and project-specific characterisation before use in structural design calculations or regulatory submissions.

Interactive tools: For detailed Prony series fitting, master curve generation, and custom time/temperature analysis, use the free simulation tools at **fractan.net**.

Fractan - Laminated Glass & Facade Engineering Consulting
fractan.net | fractan.engineering@gmail.com | Parma, Italy
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